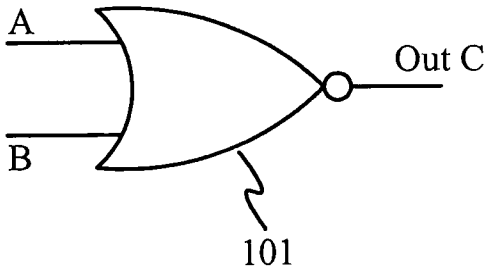
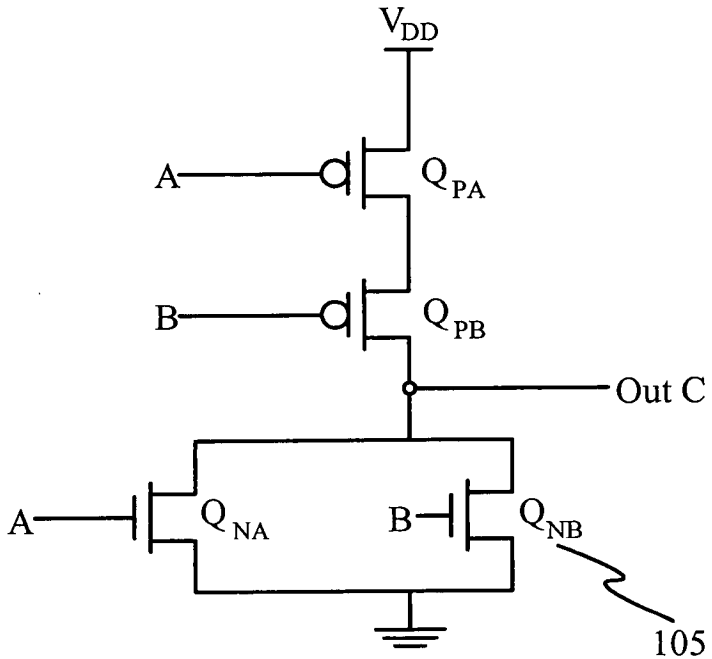


Fig. 1



A	B	C
0	0	1
0	1	0
1	0	0
1	1	0

103

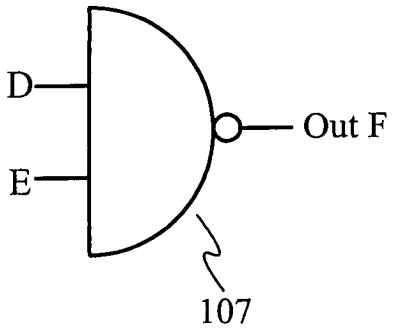
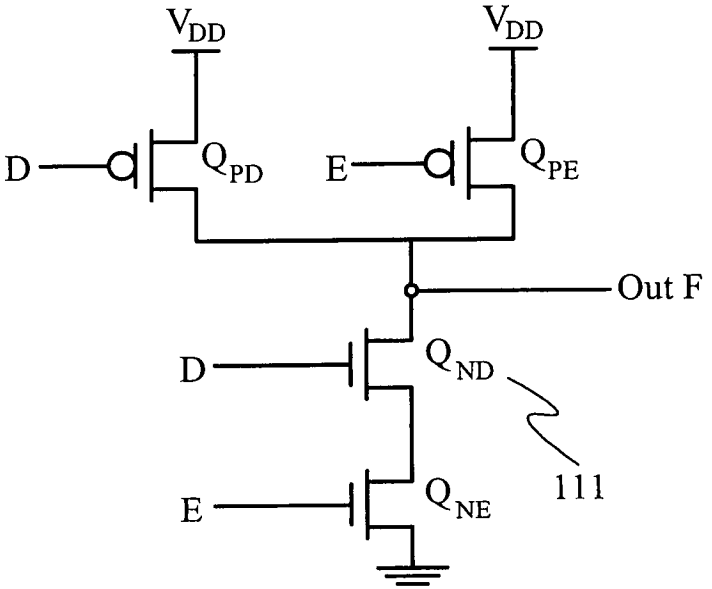


Fig. 2



D	E	F
0	0	1
0	1	1
1	0	1
1	1	0

109

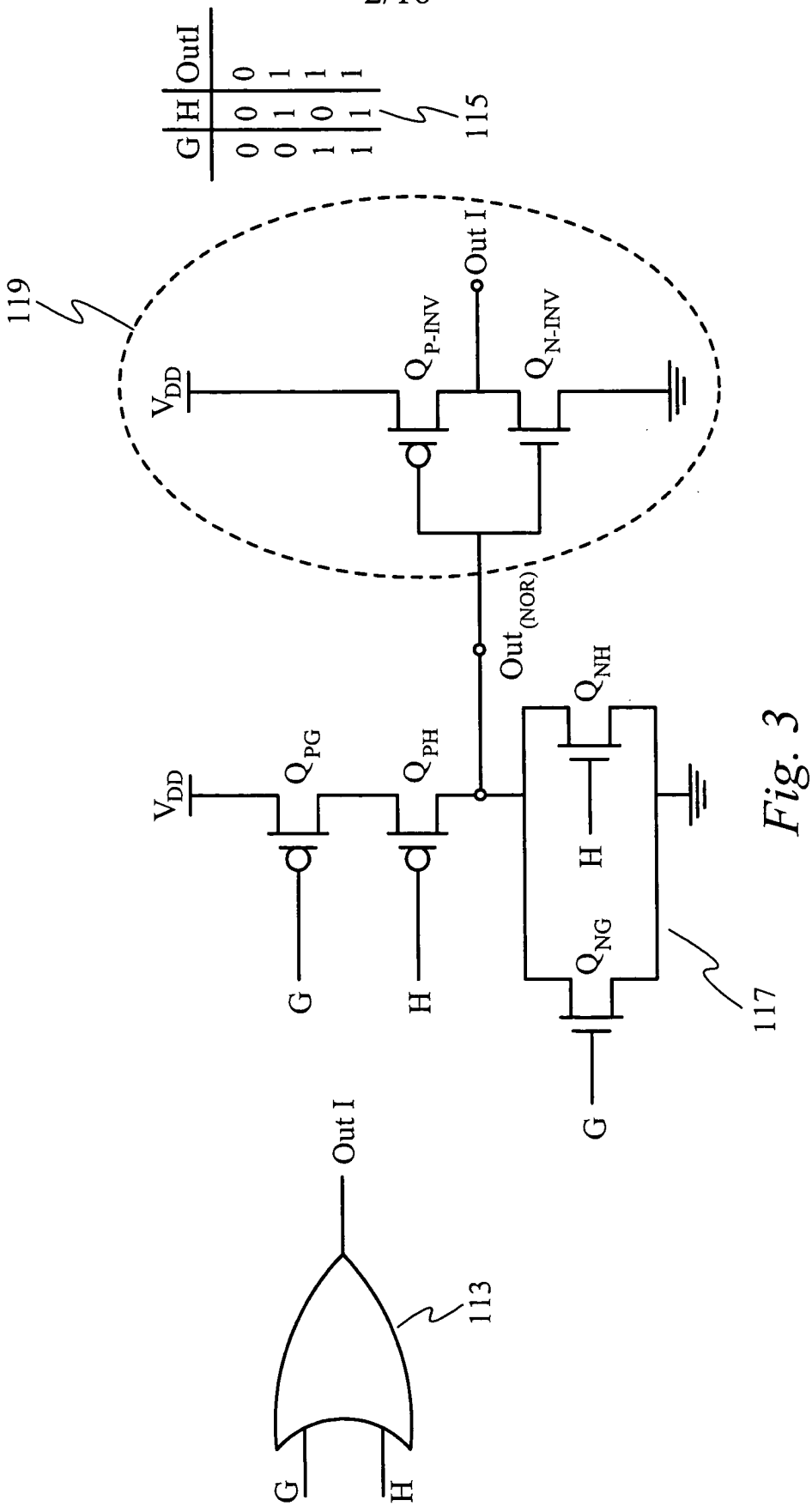

G H OutI
0 0 0
0 1 1
1 0 1
1 1 1
115
119
Out I
V_{DD}
$Q_{P\text{-}INV}$
$Q_{N\text{-}INV}$
$Out_{(NOR)}$
Q_{PG}
Q_{PH}
Q_{NH}
Q_{NG}
G
H
117
113

Fig. 3

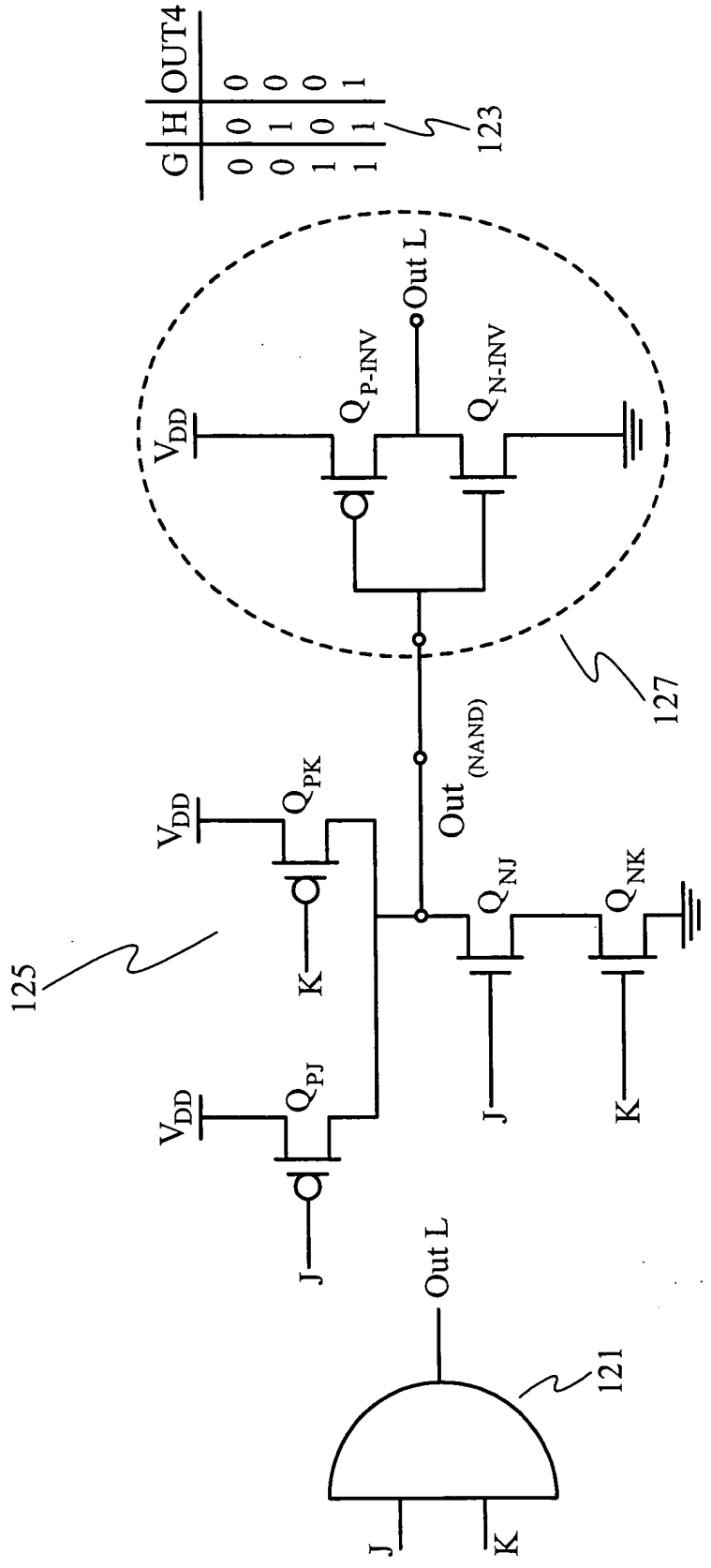
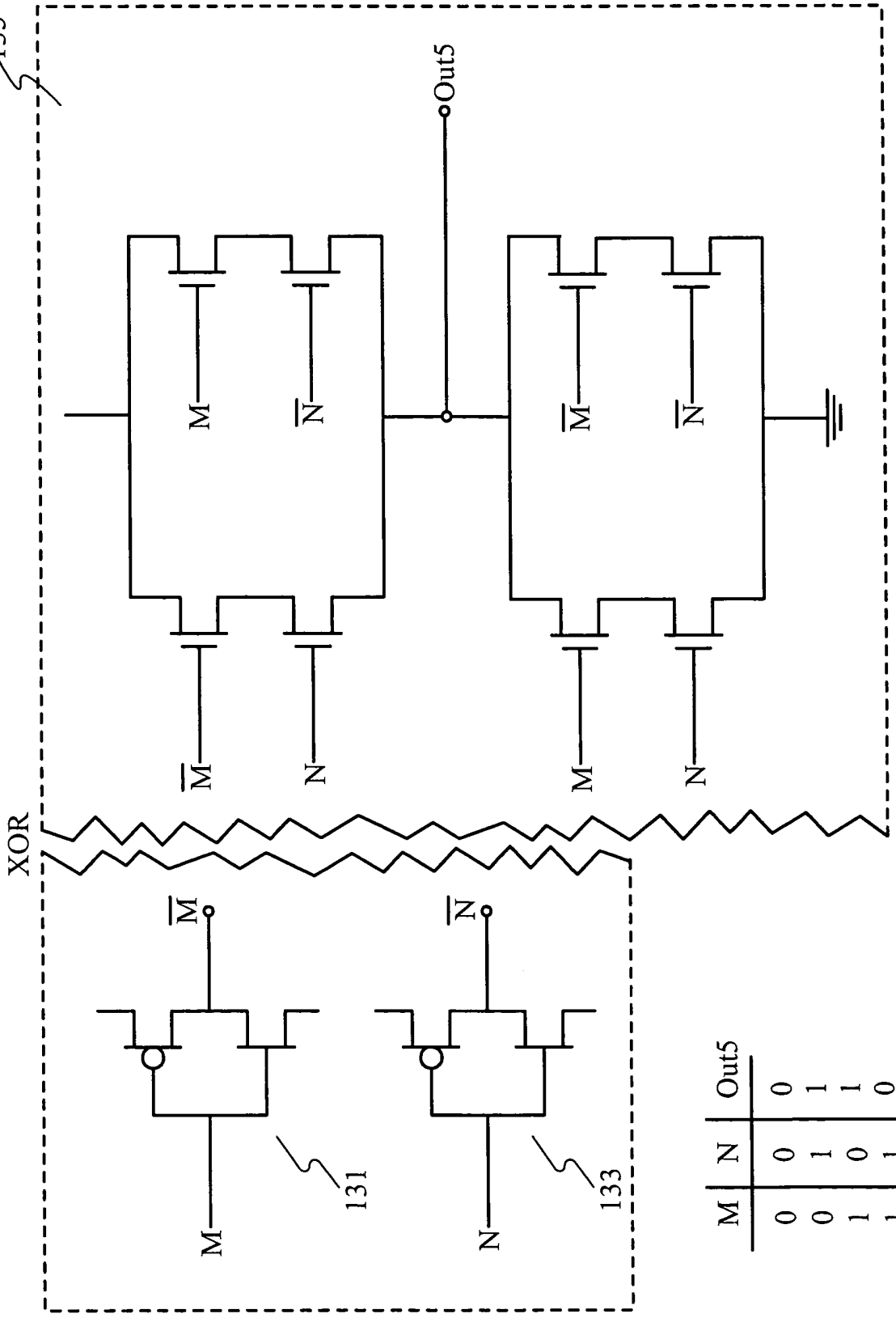

G H OUT4
0 0 0
0 1 0
1 0 0
1 1 1
123
Out L
$Q_{P\text{-}INV}$
$Q_{N\text{-}INV}$
V_{DD}
127
$Out_{(NAND)}$
Q_{PK}
Q_{NJ}
Q_{NK}
Q_{PJ}
K
J
125
Out L
121
J
K

Fig. 4



M	N	Out5
0	0	0
0	1	1
1	0	1
1	1	0

137

Fig. 5

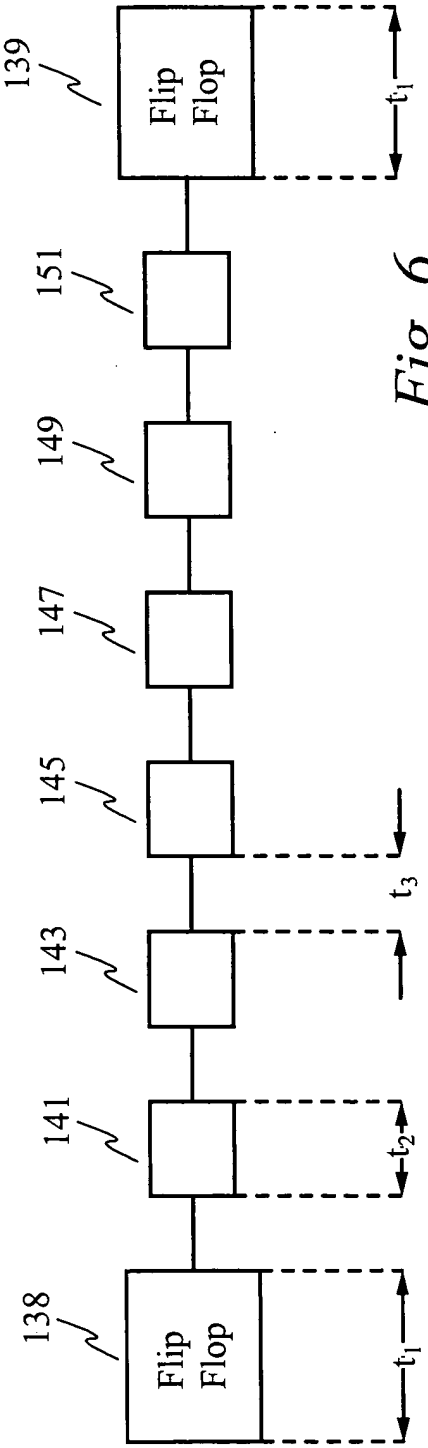

139
Flip Flop
t_1
151
149
147
145
t_3
143
141
t_2
138
Flip Flop
t_1

Fig. 6

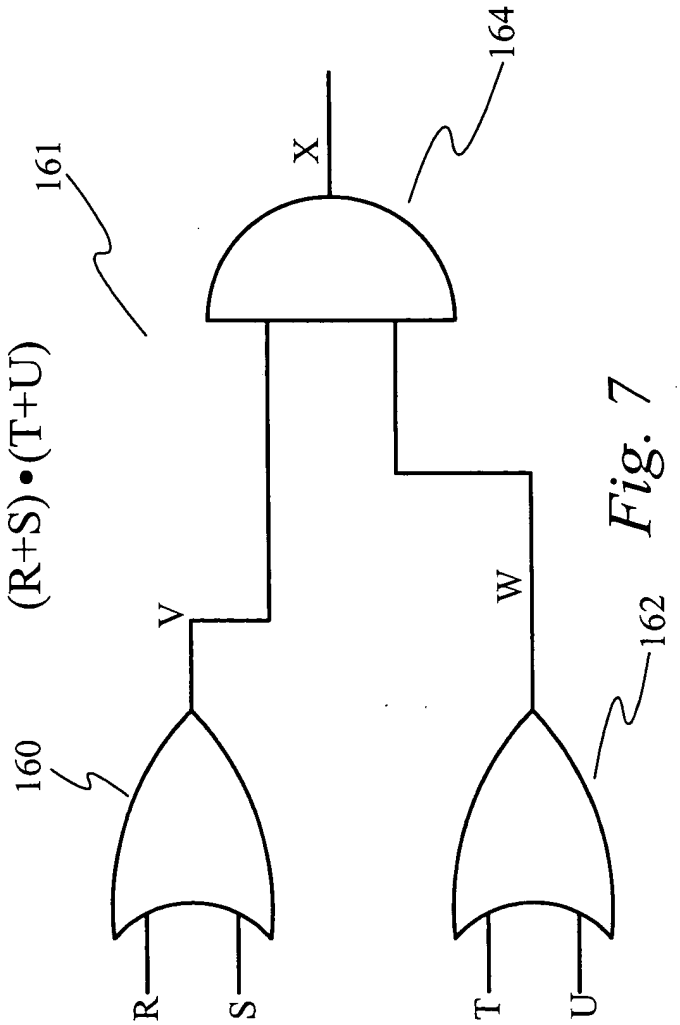

(R+S)•(T+U)
161
164
X
V
W
160
162
R
S
T
U

Fig. 7

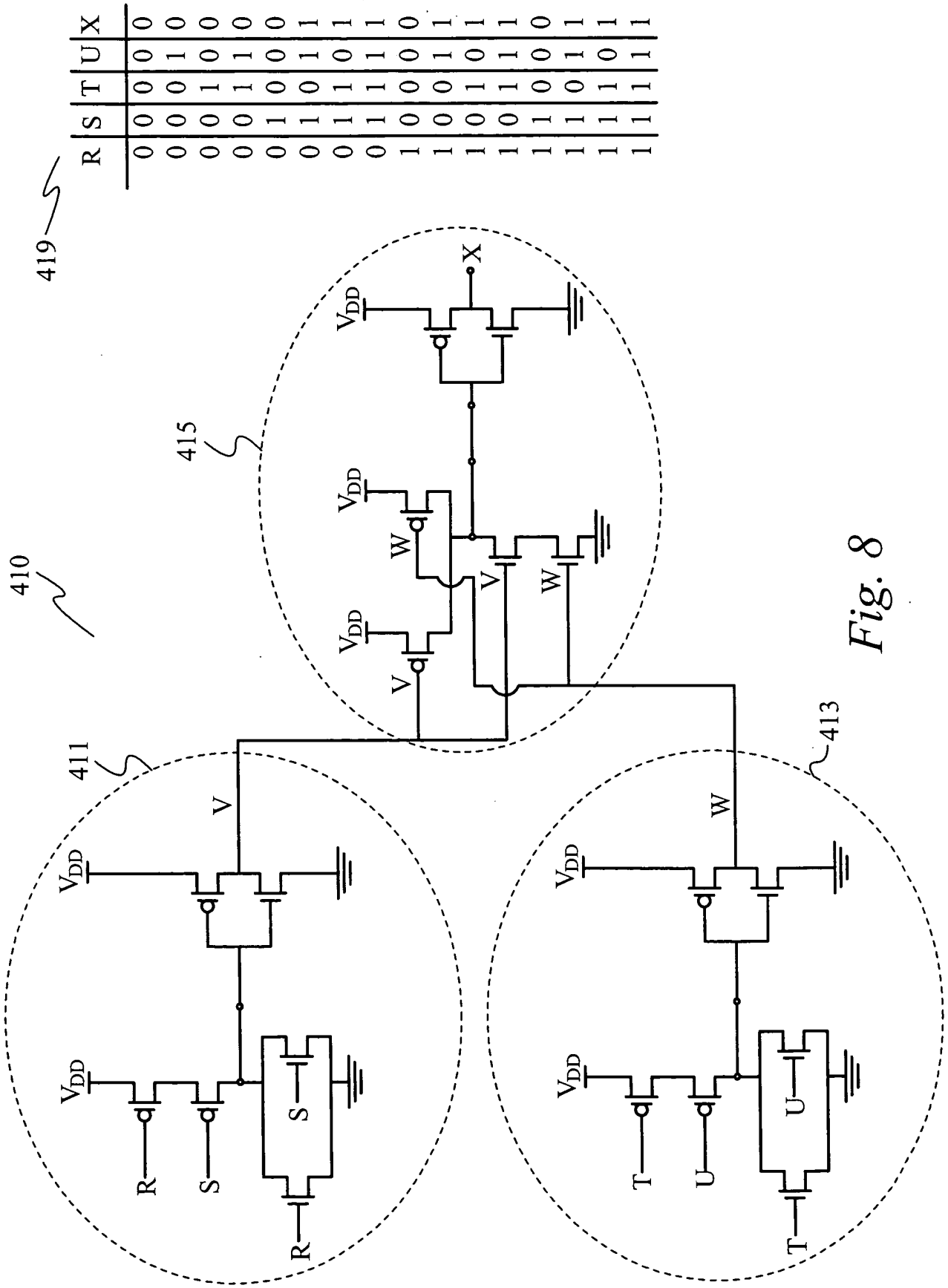

419
R S T U X
0 0 0 0 0
0 0 0 1 0
0 0 1 0 0
0 0 1 1 0
0 1 0 0 1
0 1 0 1 1
0 1 1 0 1
0 1 1 1 1
1 0 0 0 1
1 0 0 1 1
1 0 1 0 1
1 0 1 1 1
1 1 0 0 0
1 1 0 1 1
1 1 1 0 1
1 1 1 1 1
410
411
413
415
V_{DD}
R
S
T
U
V
W
X

Fig. 8

419

R	S	T	U	X
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

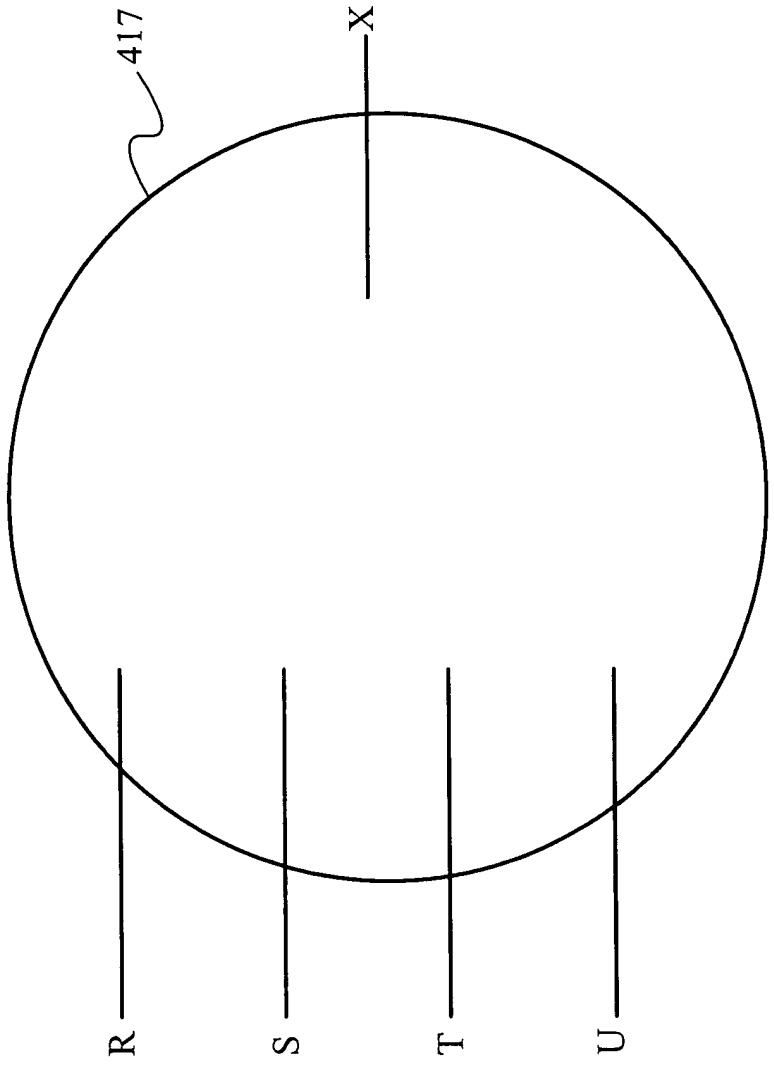
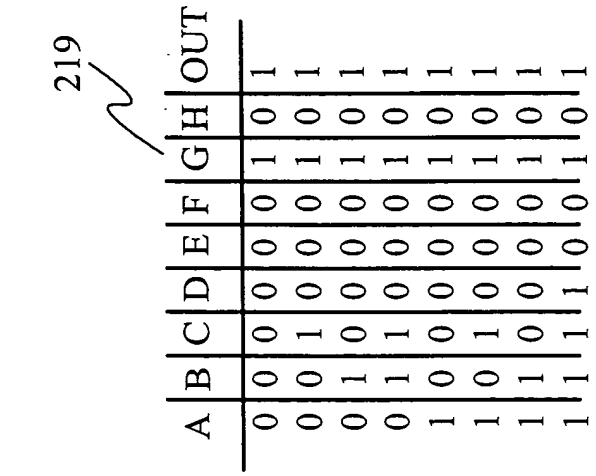


Fig. 9


219
A B C D E F G H OUT
0 0 0 0 0 0 1 0 1
0 0 1 0 0 0 1 0 1
0 1 0 0 0 0 1 0 1
0 1 1 0 0 0 1 0 1
1 0 0 0 0 0 1 0 1
1 0 1 0 0 0 1 0 1
1 1 0 0 0 0 1 0 1
1 1 1 1 0 0 0 1 1

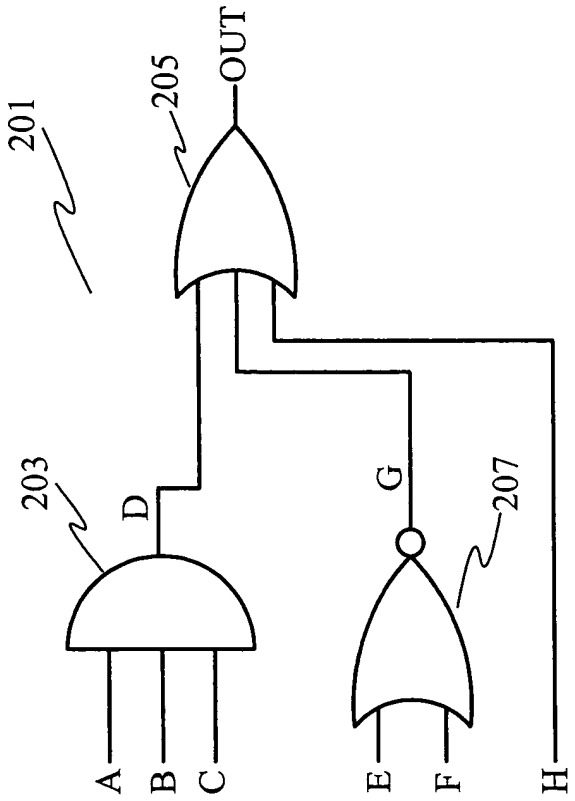

201
205
OUT
203
D
G
207
A
B
C
E
F
H

Fig. 10

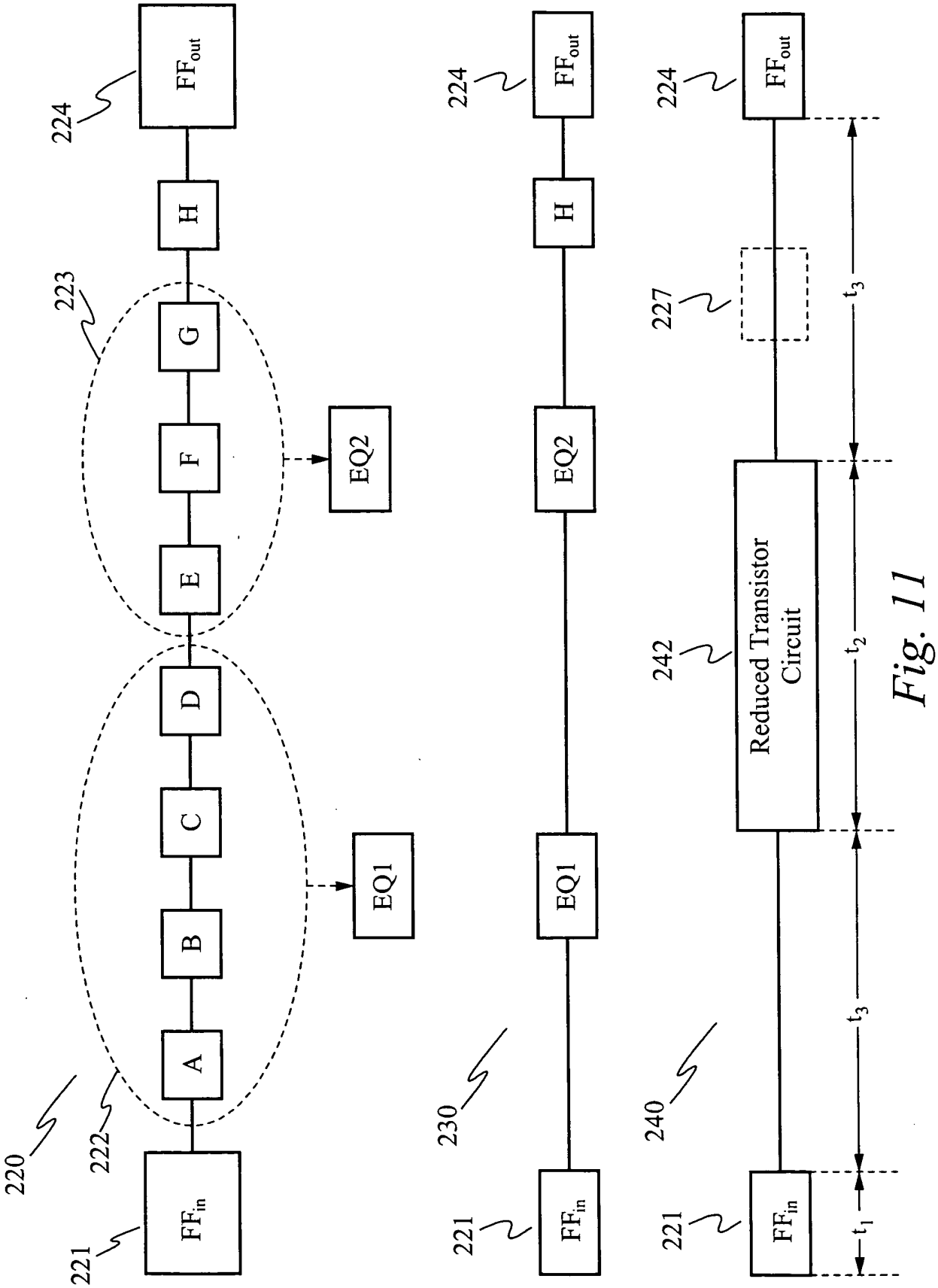

220
222
221
FF_in
A
B
C
D
EQ1
223
E
F
G
EQ2
224
H
FF_out
230
EQ1
EQ2
240
242
Reduced Transistor Circuit
227
t1
t2
t3

Fig. 11

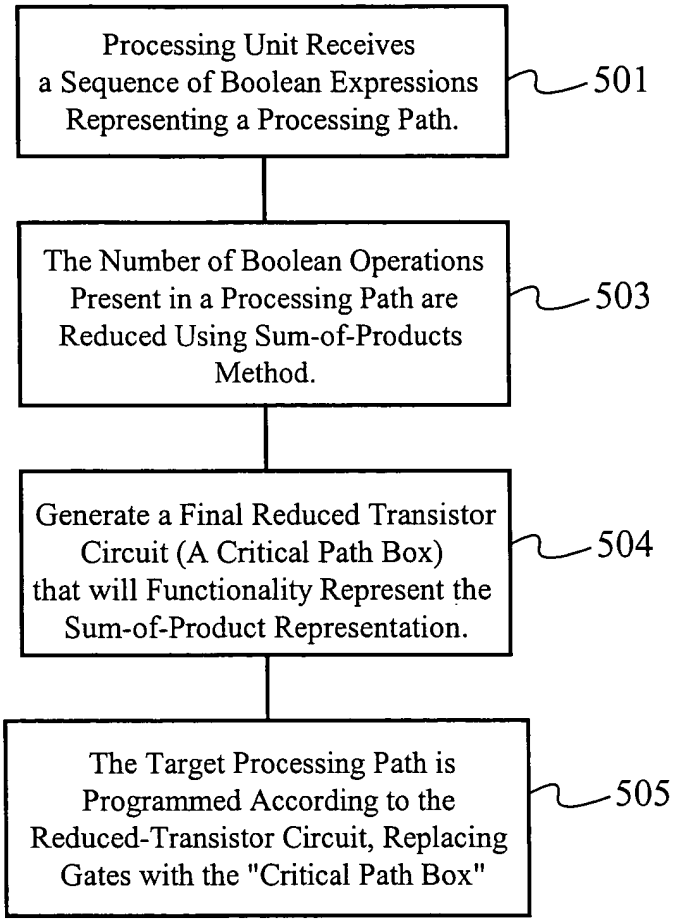

Processing Unit Receives a Sequence of Boolean Expressions Representing a Processing Path.
501
The Number of Boolean Operations Present in a Processing Path are Reduced Using Sum-of-Products Method.
503
Generate a Final Reduced Transistor Circuit (A Critical Path Box) that will Functionality Represent the Sum-of-Product Representation.
504
The Target Processing Path is Programmed According to the Reduced-Transistor Circuit, Replacing Gates with the "Critical Path Box"
505

Fig. 12

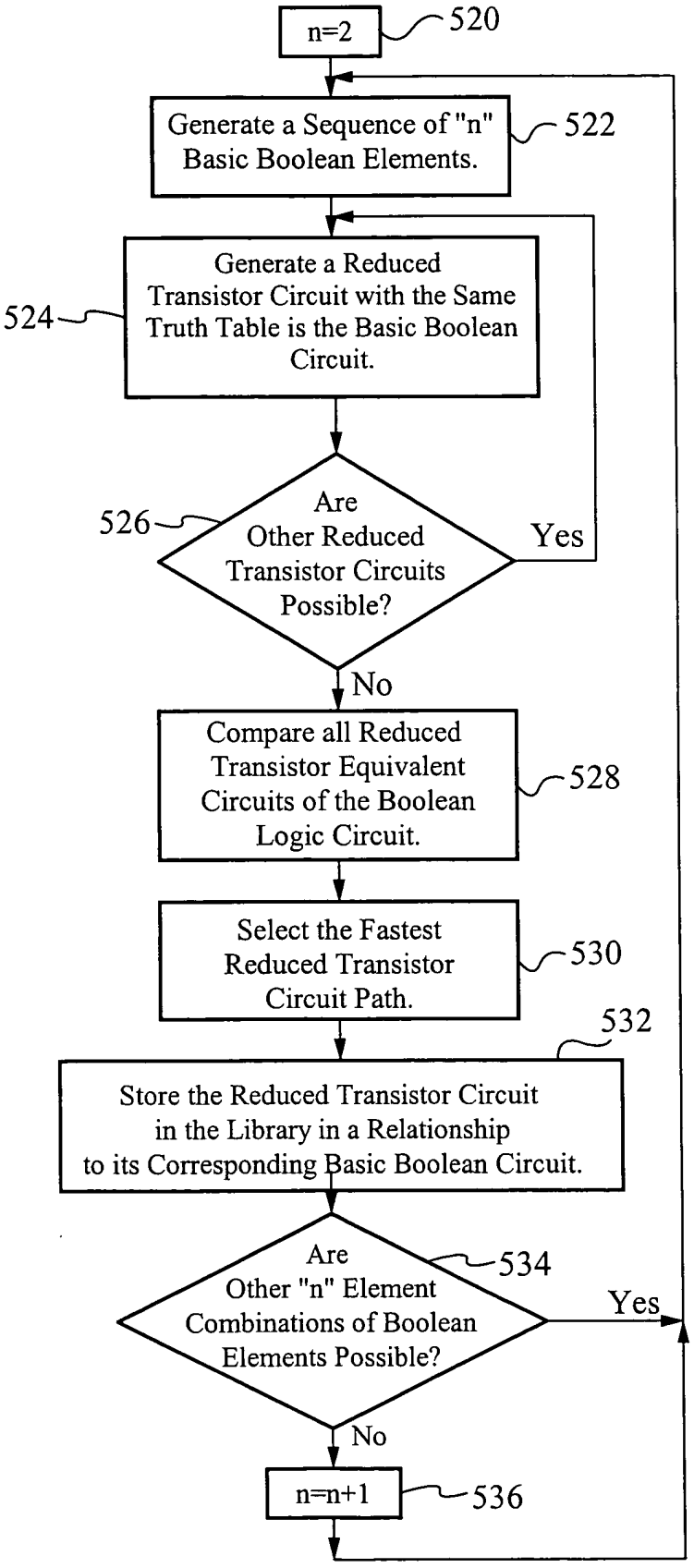

n=2
520
Generate a Sequence of "n" Basic Boolean Elements.
522
Generate a Reduced Transistor Circuit with the Same Truth Table is the Basic Boolean Circuit.
524
Are Other Reduced Transistor Circuits Possible?
526
Yes
No
Compare all Reduced Transistor Equivalent Circuits of the Boolean Logic Circuit.
528
Select the Fastest Reduced Transistor Circuit Path.
530
532
Store the Reduced Transistor Circuit in the Library in a Relationship to its Corresponding Basic Boolean Circuit.
Are Other "n" Element Combinations of Boolean Elements Possible?
534
Yes
No
n=n+1
536

Fig. 13

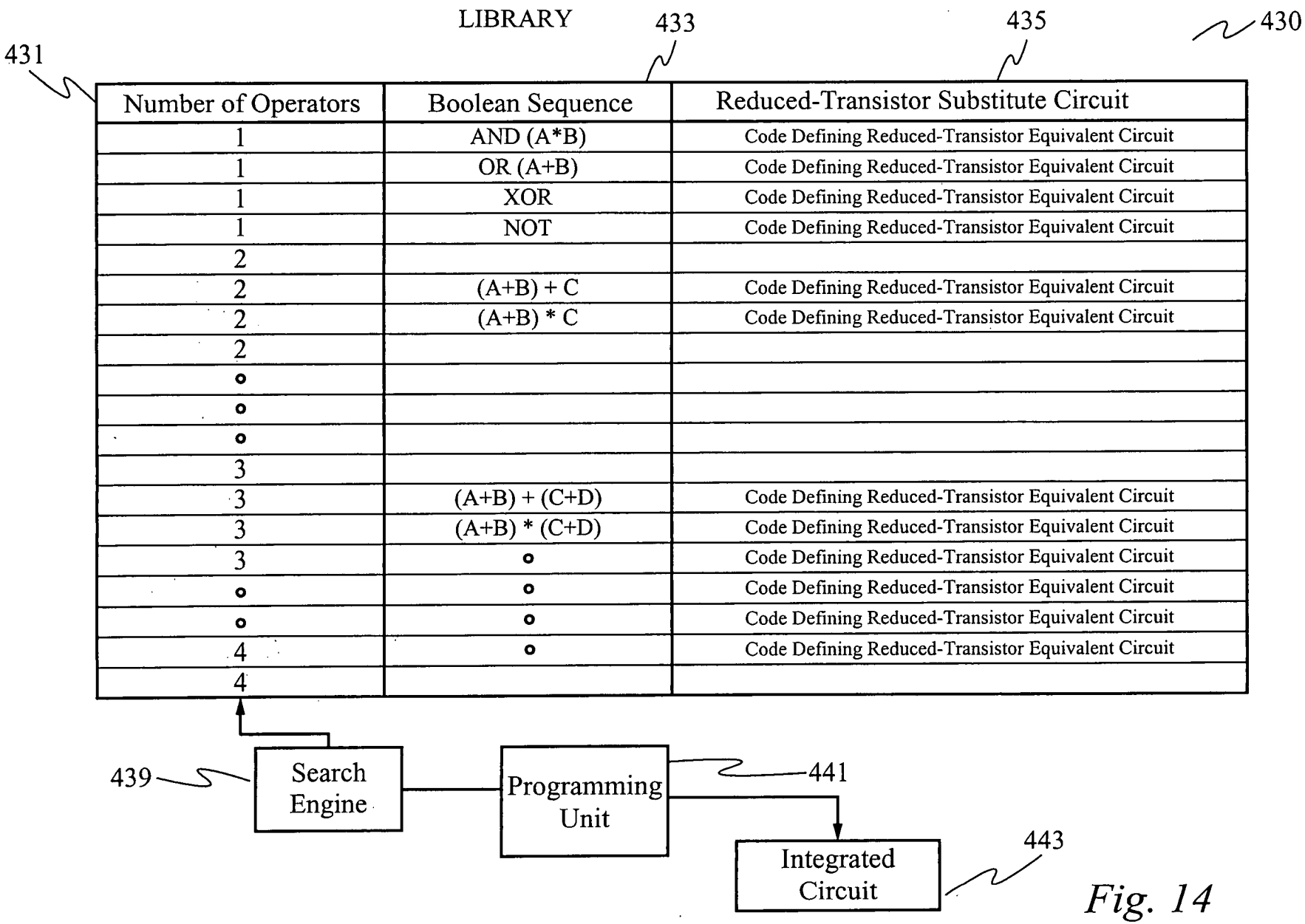

LIBRARY
433
435
430
431
Number of Operators
Boolean Sequence
Reduced-Transistor Substitute Circuit
1 AND (A*B) Code Defining Reduced-Transistor Equivalent Circuit
1 OR (A+B) Code Defining Reduced-Transistor Equivalent Circuit
1 XOR Code Defining Reduced-Transistor Equivalent Circuit
1 NOT Code Defining Reduced-Transistor Equivalent Circuit
2
2 (A+B) + C Code Defining Reduced-Transistor Equivalent Circuit
2 (A+B) * C Code Defining Reduced-Transistor Equivalent Circuit
2
o
o
o
3
3 (A+B) + (C+D) Code Defining Reduced-Transistor Equivalent Circuit
3 (A+B) * (C+D) Code Defining Reduced-Transistor Equivalent Circuit
3 o Code Defining Reduced-Transistor Equivalent Circuit
o o Code Defining Reduced-Transistor Equivalent Circuit
o o Code Defining Reduced-Transistor Equivalent Circuit
4 o Code Defining Reduced-Transistor Equivalent Circuit
4
439
Search Engine
Programming Unit
441
Integrated Circuit
443

Fig. 14

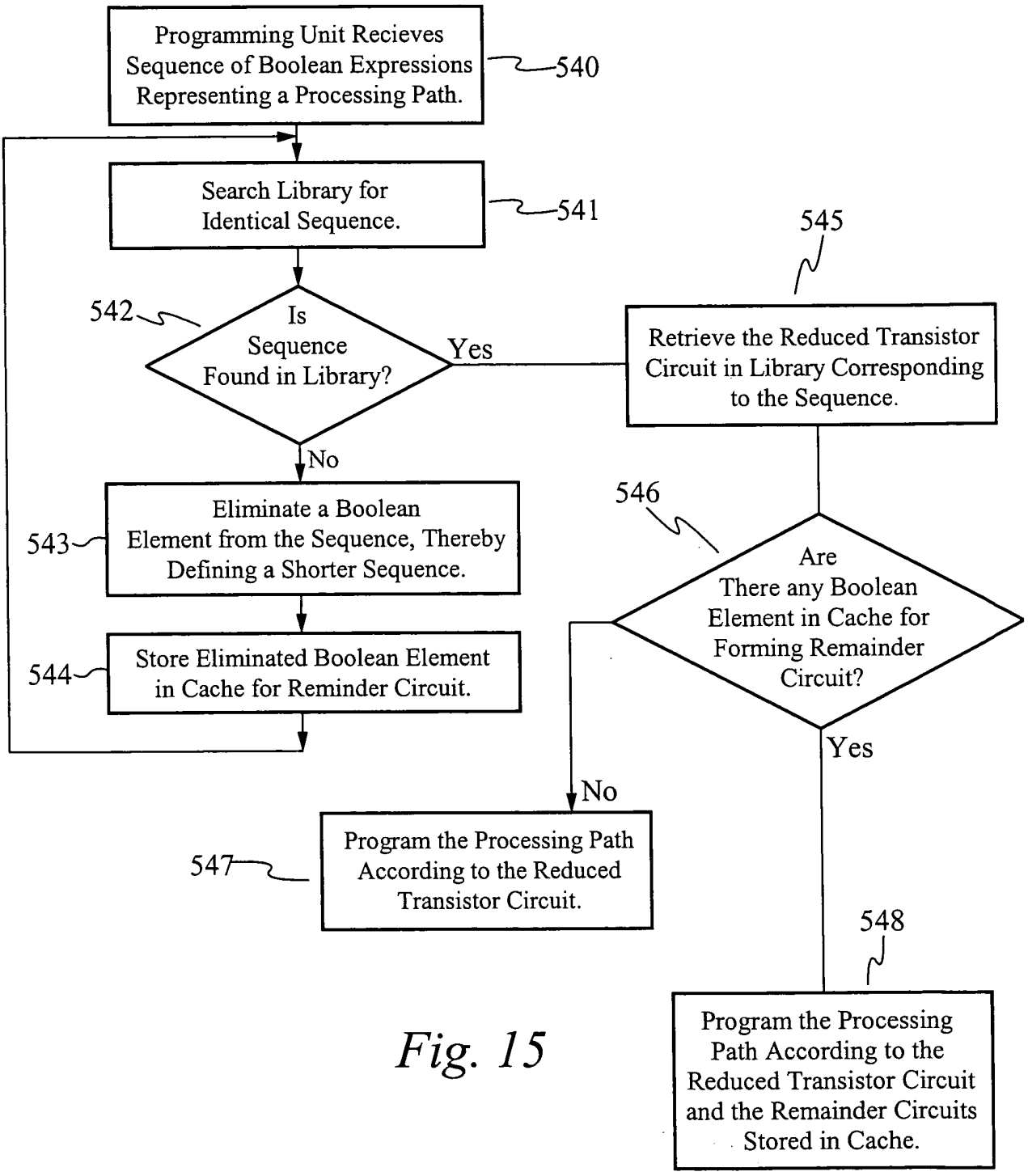

Programming Unit Recieves Sequence of Boolean Expressions Representing a Processing Path.
540
Search Library for Identical Sequence.
541
542
Is Sequence Found in Library?
Yes
No
545
Retrieve the Reduced Transistor Circuit in Library Corresponding to the Sequence.
543
Eliminate a Boolean Element from the Sequence, Thereby Defining a Shorter Sequence.
544
Store Eliminated Boolean Element in Cache for Reminder Circuit.
546
Are There any Boolean Element in Cache for Forming Remainder Circuit?
Yes
No
547
Program the Processing Path According to the Reduced Transistor Circuit.
548
Program the Processing Path According to the Reduced Transistor Circuit and the Remainder Circuits Stored in Cache.

Fig. 15

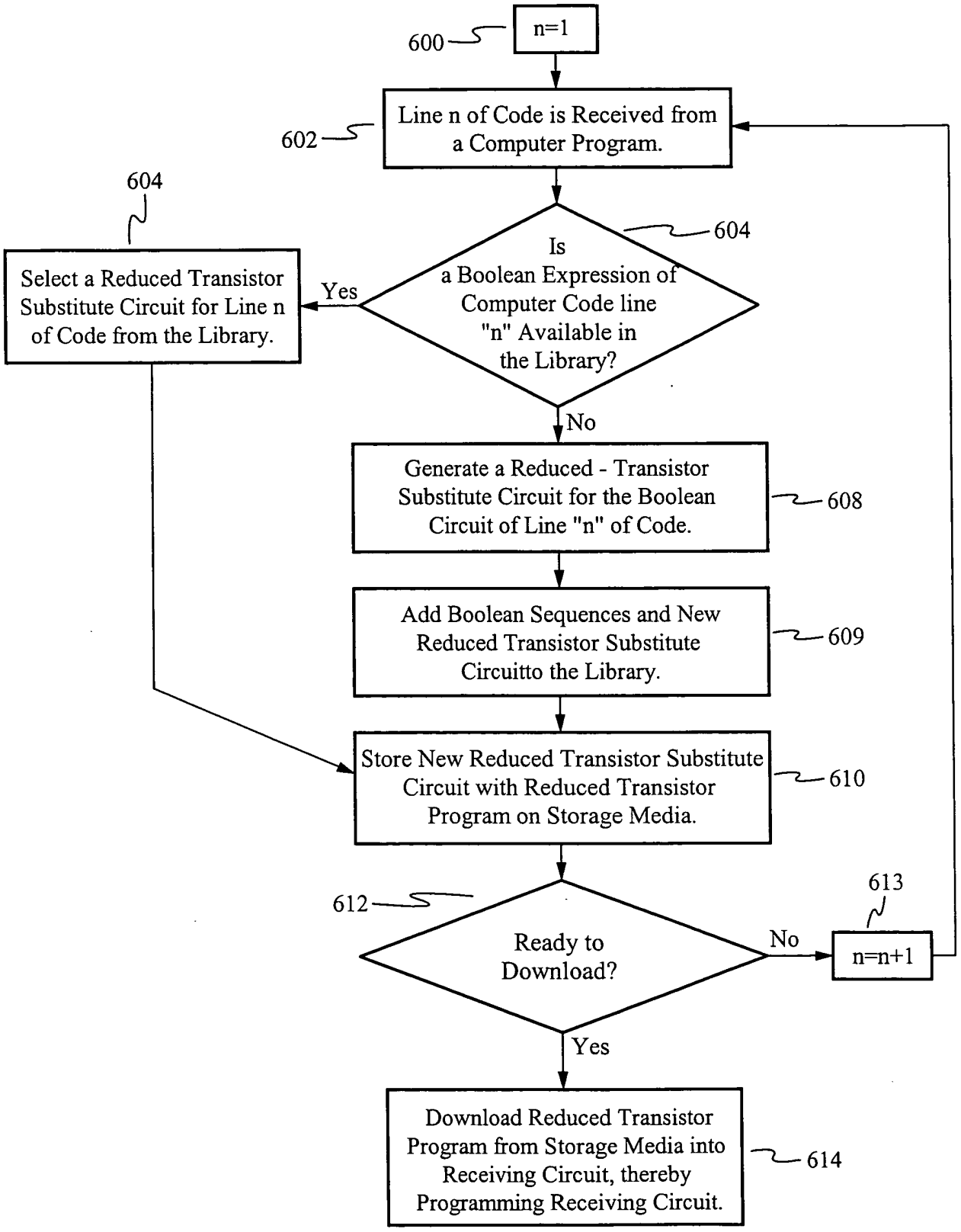

n=1
600
Line n of Code is Received from a Computer Program.
602
604
Is a Boolean Expression of Computer Code line "n" Available in the Library?
604
Yes
Select a Reduced Transistor Substitute Circuit for Line n of Code from the Library.
No
Generate a Reduced - Transistor Substitute Circuit for the Boolean Circuit of Line "n" of Code.
608
Add Boolean Sequences and New Reduced Transistor Substitute Circuitto the Library.
609
Store New Reduced Transistor Substitute Circuit with Reduced Transistor Program on Storage Media.
610
612
Ready to Download?
No
613
n=n+1
Yes
Download Reduced Transistor Program from Storage Media into Receiving Circuit, thereby Programming Receiving Circuit.
614

Fig. 16

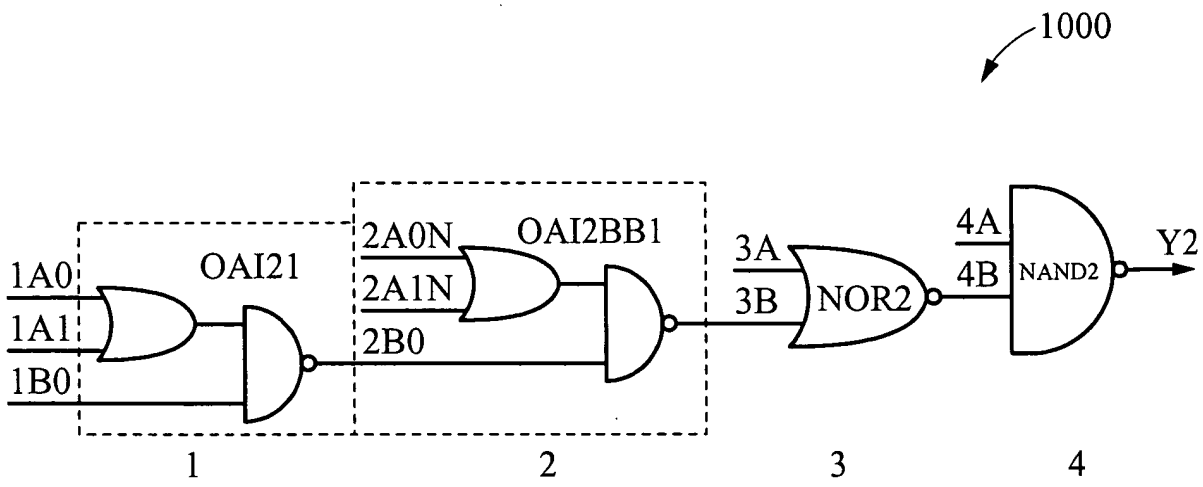

1000
1A0
1A1
1B0
OAI21
2A0N
2A1N
2B0
OAI2BB1
3A
3B
NOR2
4A
4B
NAND2
Y2
1
2
3
4

Fig. 17

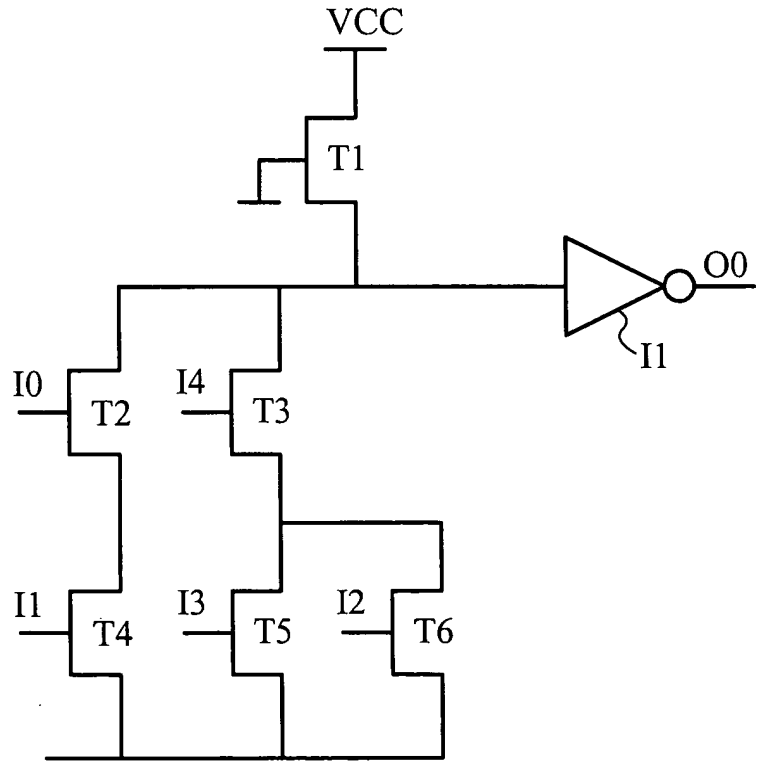

VCC
T1
O0
I1
I0
T2
I4
T3
I1
T4
I3
T5
I2
T6

Fig. 18

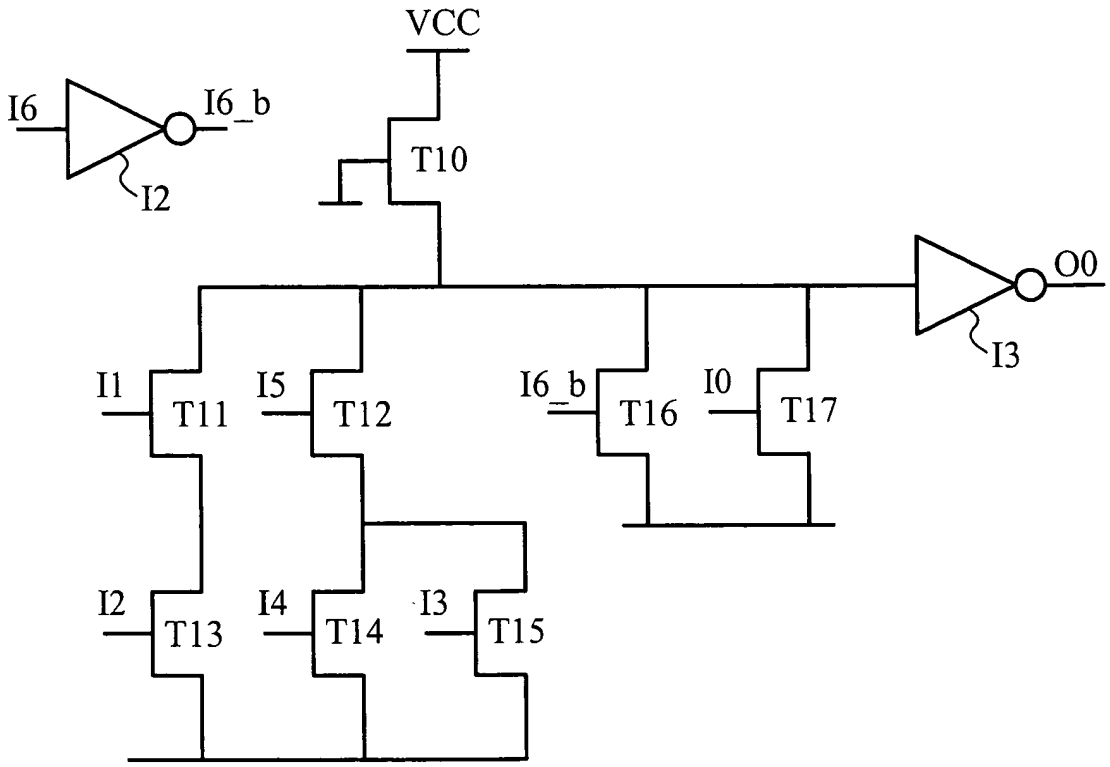

VCC
I6
I6_b
I2
T10
O0
I3
I1
T11
I5
T12
I6_b
T16
I0
T17
I2
T13
I4
T14
I3
T15

Fig. 19